

### IN THE CLAIMS

The current status of the claims is reflected in the below listing of claims.

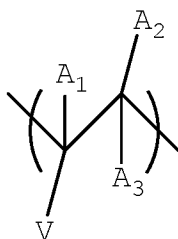
1. (Currently Amended) A polyelectrolyte film comprising an interpenetrating network of a net positively charged polyelectrolyte polymer comprising repeat units with at least two fluorine atoms and a net negatively charged polyelectrolyte polymer comprising repeat units with at least two fluorine atoms, ~~wherein the net positively charged polymer, the net negatively charged polymer, or both contain polymer repeat units with at least two fluorine atoms.~~

2. (Original) The polyelectrolyte film of claim 1 wherein the net positively charged polymer and the net negatively charged polymer are independently selected from the group consisting of polyolefins, polyamines, polyamides, polyethers, polyesters, polyimides, polysulfones, polyaryls, polyphenols, polyaramides, and copolymers thereof.

3. (Original) The polyelectrolyte film of claim 1 wherein the net positively charged polymer and the net negatively charged polymer are polyolefins having vinyl groups.

4. (Original) The polyelectrolyte film of claim 3 wherein the vinyl group is an allyl group.

5. (Currently Amended) The polyelectrolyte film of claim 2 wherein the repeat unit has the structure:



wherein  $A_1$ ,  $A_2$ , and  $A_3$  are each independently  $-(CH_2)_mH$  or  $-(CH_xF_{2-x})_nF$  ; where  $m$  and  $n$  are independently 0 to 12 , ;  $x$  is 0, 1, or 2; and each  $V$  is independently selected from the group consisting of:

fluorinated hydrocarbons having the formula:

$-(CH_2)_p(CF_2)_qF$ ;  $-(CH_2)_p(CF_2)_qCOOH$ ;  $-(CH_2)_p(CF_2)_qOPO_3^-$ ;  
 $-(CH_2)_p(CF_2)_qSO_3^-$ ;  $-(CH_2)_p(CF_2)_qOSO_3^-$ ;  $-O(CH_2)_p-(CF_2)_q-F$ ; or  
 $-O(CH_2)_p(CF_2)_q-SO_3^-$ ;

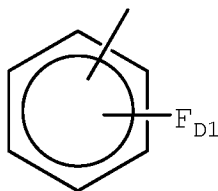
fluorinated amides having the formulae  $-CONB_1$  wherein  $B_1$  is

$-(CH_2)_p(CF_2)_qF$ ;  $-(CH_2)_p(CF_2)_qCOOH$ ;  $-(CH_2)_p(CF_2)_qOPO_3^-$ ;  
 $-(CH_2)_p(CF_2)_qSO_3^-$ ; or  $-(CH_2)_p(CF_2)_qOSO_3^-$ ;

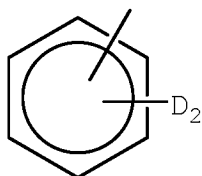
fluorinated esters having the formulae  $-COOC_1$  wherein  $C_1$  is

$-(CH_2)_p(CF_2)_qF$ ;  $-(CH_2)_p(CF_2)_qCOOH$ ;  $-(CH_2)_p(CF_2)_qOPO_3^-$ ;  
 $-(CH_2)_p(CF_2)_qSO_3^-$ ; or  $-(CH_2)_p(CF_2)_qOSO_3^-$ ;

fluorinated phenyl groups having the formulae:

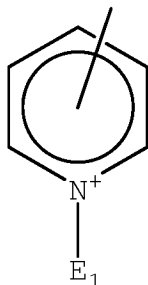


wherein  $D_1$  is 2 to 5; or



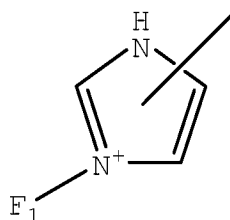
wherein  $D_2$  is  $-(CH_2)_p(CF_2)_qF$  or  $-O(CH_2)_p(CF_2)_qF$ ;

fluorinated pyridiniums having the formulae:



wherein  $E_1$  is  $-(CH_2)_p(CF_2)_qF$ ;

fluorinated imidazoliums having the formulae:



wherein  $F_1$  is  $-(CH_2)_p(CF_2)_qF$ ;

fluorinated quaternary nitrogens having the formulae  
 $-N^+G_1G_2G_3$  where  $G_1$ ,  $G_2$ , and  $G_3$  are each independently  
 $-(CH_2)_p(CF_2)_qF$  or  $-arylF_z$  wherein  $z$  is 2 to 8;

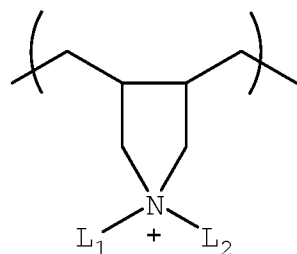
fluorinated sulfoniums having the formulae  
 $-S^+H_1H_2$  where  $H_1$  and  $H_2$  are independently  $-(CH_2)_p(CF_2)_qF$ ;  
 Or  $-arylF_z$  where  $z$  is 2 to 8; and

fluorinated phosphoniums having the formulae  
 $-P^+J_1J_2J_3$  where  $J_1$ ,  $J_2$ , and  $J_3$  are independently:  
 $-(CH_2)_p(CF_2)_qF$ ; or  $-arylF_z$  where  $z$  is 2 to 8;

$p$  is 0 to 6 and

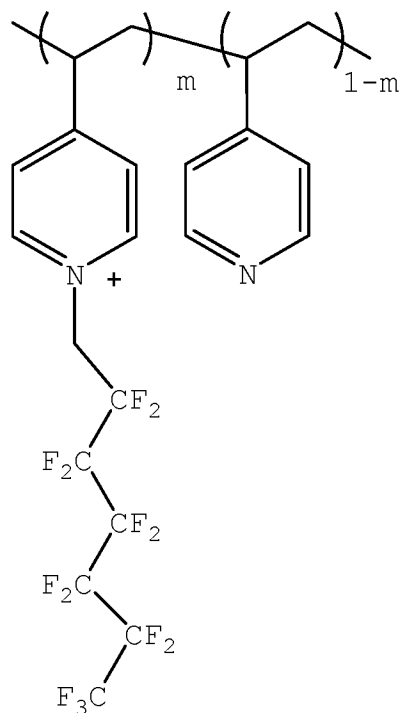
$q$  is 1 to 21.

6. (Original) The polyelectrolyte film of claim 2 wherein the polymer repeat unit comprises an allyl group having the structure:



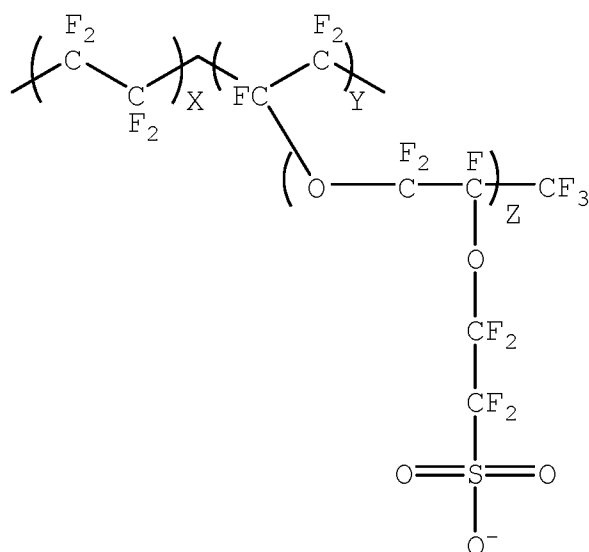
wherein  $L_1$  and  $L_2$  are  $-(CH_2)_p(CF_2)_qF$ ,  $p$  and  $q$  are independently selected for  $L_1$  and  $L_2$ , and  $p$  is 0 to 6 and  $q$  is 1 to 21.

7. (Original) The polyelectrolyte film of claim 1 wherein the net positively charged polymer has the structure:



wherein  $m$  is a mole fraction from about 0.1 to about 1.0.

8. (Original) The polyelectrolyte film of claim 1 wherein the net negatively charged polymer has the structure:



wherein X is from about 6 to about 10, Y is about 1, and Z is from about 1 to about 3.

9. (Original) The polyelectrolyte film of claim 1 further comprising particles having a size in the range of about 1 nanometer to about 10 micrometers.

10. (Original) The polyelectrolyte film of claim 9 wherein the particles are selected from the group consisting of silicon dioxide, aluminum oxide, titanium dioxide, iron oxide, zirconium oxide, vanadium oxide, clay minerals, carbon fibers, carbon nanotubes, and charged fluorinated particles.

11. (Original) The polyelectrolyte film of claim 10 wherein the particle is the clay mineral, and the clay mineral comprises attapulgite clay.

12. (Currently Amended) A film comprising a ~~fluorinated~~ charged **polyelectrolyte** polymer **comprising repeat units with at least two fluorine atoms** and a fluorinated charged particle

comprising repeat units with at least two fluorine atoms, wherein the charge of the polyelectrolyte polymer is opposite that of the charge of the fluorinated charged particle.

13. (Original) The film of claim 12 wherein the fluorinated charged particle comprises polytetrafluoroethylene.

14. (Withdrawn -- Currently Amended) A method for controlling the hydrophobicity of a surface of an article, the method comprising alternately depositing solutions comprising net positively charged polymers comprising repeat units with at least two fluorine atoms and net negatively charged polymers comprising repeat units with at least two fluorine atoms onto the surface of the article to form a polyelectrolyte film of an interpenetrating network of the net positively charged polymers and the net negatively charged polymers on the surface of the article ~~, wherein the net positively charged polymer, the net negatively charged polymer, or both contain polymer repeat units with at least two fluorine atoms.~~

15. (Withdrawn) The method of claim 14 wherein the solutions are deposited by spraying, immersing, or brushing the surface of the article with solutions comprising the net positively charged polymers and net negatively charged polymers.

16. (Withdrawn) The method of claim 15 wherein the solution comprises the net positively charged polymers and net negatively charged polymers dissolved in supercritical CO<sub>2</sub>.

17. (Withdrawn) The method of claim 14 wherein the article is selected from the group consisting of glass, plastics, paint, metal, and ceramic.

18. (Withdrawn) The method of claim 14 wherein the article is a construction material selected from the group consisting of brick, tile, grout, wood, concrete, and stone.

19. (Withdrawn) The method of claim 14 wherein the article is a soft material said soft material selected from the group consisting of carpet, garment, cloth, fabric, upholstery, and leather.

20. (Withdrawn) The method of claim 19 wherein the article is carpet, said carpet comprising fibers selected from the group consisting of polyester, polyolefin, polyamide, and copolymers thereof.

21. (Withdrawn) The method of claim 14 wherein the article is a fiber optic or waveguide, and the polyelectrolyte film is used as a cladding on the surface of the fiber optic or waveguide.

22. (Withdrawn) The method of claim 14 wherein the article is a metal selected from the group consisting of steel or aluminum, and the polyelectrolyte film is coated on the surface of the metal to prevent the corrosion of the metal.

23. (Withdrawn) The method of claim 14 wherein the article is a fuel cell and the polyelectrolyte film is used as a proton exchange membrane.

24. (Withdrawn) The method of claim 23 wherein the polyelectrolyte film has a thickness of less than 1 micrometer.

25. (Withdrawn) The method of claim 24 wherein the polyelectrolyte film further comprises small fluorinated counterions.

26. (Withdrawn) The method of claim 24 wherein the small fluorinated counterions are selected from the group consisting of perfluoroalkanesulfonic acids and perfluoroalkancarboxylic acids.

27. (Withdrawn) The method of claim 23 wherein the polyelectrolyte film is formed on the surface of a film of poly perfluorinated sulfonated ionomer, wherein the poly perfluorinated sulfonated ionomer film has a thickness between 10 micrometers and 1000 micrometers.

28. (Original) A thin film of claim 1 used for the purpose of reducing friction at a surface.

29. (Currently Amended) ~~A thin film~~ **The polyelectrolyte film** of claim ~~1~~ **28** ~~used for the purpose of reducing friction as in claim 30. Said~~ **wherein said** surface **is** selected from the group **consisting of** metals, plastic, semiconductor, **and** metal oxide.

30. (Currently Amended) ~~A thin film~~ **The polyelectrolyte film** of claim 1 **in contact with and on a surface of** ~~on the surface of, and in contact with,~~ a rotating disc magnetic storage medium ("fixed disc").



31. (Currently Amended) ~~A thin film~~ **The polyelectrolyte film** of claim 1 **in contact with and on a surface of** ~~on the surface of, and in contact with,~~ a rotating disc magnetic storage medium ("fixed disc") ~~, and a further film~~ **wherein the polyelectrolyte film further comprises a surface layer comprising** ~~of~~ **a** fluorinated small molecule or **a** fluorinated oligomer ~~in contact with said thin film of claim 1.~~

32. (Currently Amended) ~~A thin film~~ **The polyelectrolyte film** of claim 1 formed between two contacting, moving metal surfaces.

33. (Currently Amended) ~~A thin film~~ **The polyelectrolyte film** of claim 1 formed between two contacting, moving metal surfaces, said **polyelectrolyte** film formed by the addition of particles of complexed fluorinated polyelectrolytes.

34. (Withdrawn) A motor oil comprising particles of complexed fluorinated polyelectrolytes, said oil lubricating the moving metal parts of said motor.

35. (Withdrawn) A motor oil comprising particles of complexed fluorinated polyelectrolytes, said oil lubricating the moving metal parts of said motor, said oil further comprising fluorinated polymer.

36. (Currently Amended) ~~A thin film~~ **The polyelectrolyte film** of claim 1 forming an intermediate layer between an electrically conductive contact and a thin film of medium, said medium emitting light on passage of an electrical current.

37. (Currently Amended) ~~A thin film~~ **The polyelectrolyte film** of claim 1 forming an intermediate layer between an electrically conductive contact and a light emitting medium, said contact injecting electrons into said medium.

38. (Currently Amended) ~~A thin film~~ **The polyelectrolyte film** of claim 1 forming an intermediate layer between an electrically conductive contact and a light emitting medium, said medium comprising a conjugated polymer.